2010-01-01

Concurrent Masters Degrees Across the Atlantic: Innovations, Issues and Insights

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Recommended Citation
Dyrenfurth, M., Murphy, M., Bertoline, G., Herrick, R., Newton, K., O'Donnell, G., McHale, D., Castell, N., Barcelo, M., Balas, D., Sancho, M., Garcia, J.: Concurrent Masters Degrees Across the Atlantic: Innovations, Issues and Insights. American Society for Engineering Education Annual Conference, Louisville, Kentucky, USA, June, 20-23, 2010.

AC 2010-1372: CONCURRENT MASTERS DEGREES ACROSS THE ATLANTIC: INNOVATIONS, ISSUES & INSIGHTS

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Concurrent Technology Masters Degrees Across the Atlantic: Innovations, Issues & Insights[1]

Introduction

Atransatlantic degree consortium to implement a four-semester dual masters degree initiative across a three-institution consortium consisting of Purdue University (USA), the Dublin Institute of Technology (DIT), and the Universitat Politècnica de Catalunya (Spain) is presented in this paper. This initiative, while focusing on graduate (Masters) student mobility, also includes faculty mobility, language instruction and assessment, project evaluation and other services to insure ongoing success. Effective existing collaborations, i.e., an active undergraduate exchange semester and collaborative faculty activity established a solid foundation for the new dual/concurrent technology degree program and enabled it to get off to a fast start. Two of the new consortium members are already partnering in an Atlantis undergraduate student mobility project that is working well and which has generated considerable student and faculty traffic and collaboration well in excess of the funding requirements [1]. The partners have invested considerable amounts of their own monies in building the relationship and thus evidence the sustainability of the new dual transatlantic technology masters degree program.

Globalization, technological innovation and sustainability are critical issues for most if not all nations in the world. Nowhere do these concerns converge more than in the preparation of leaders with significant capabilities in technology. In the Americas and in Europe, advanced programs in leadership development are often configured as master's degree programs – both conventional and professional (see the National Academy Press' recent document [2] on this for evidence). There exists a wide range of masters programs that include professional masters, MBAs, online degrees, and conventional campus-based experiences. But, few if any focus specifically on the intersection of Technology – Globalization – Innovation and Sustainability!

Innovativelyfunded bythe European Union (EU) and the US Fund for the Improvement of Postsecondary Education (FIPSE) pursuant to their joint Atlantis initiative, this Concurrent Master's Degree program will result in the award of two masters' degrees, one from each side of the Atlantic, in an accelerated time frame. The program involves shared experiences such as the research project/thesis, formal language study, and coursework that draws on the specific strengths of each of the partnering institutions. This papersubsequently highlights key aspects of programs of study, memoranda of agreements, cross- Atlantic program management techniques, and more. Additional topics highlighted include:

- Unique program features and rationales therefore
- Student & faculty orientation procedures
- Faculty mobility objectives and mechanisms
- Incorporation of a scholarly overlay
- Assessment of learning outcomes
- Continuous improvement process
- Talent recruitment
- Third party evaluation

[1]The contents of this report were developed under a EU-U.S. Atlantis grant from the Fund for the Improvement of Postsecondary Education, (FIPSE), U.S. Department of Education. However, those contents do not necessarily represent the policy of the Department of Education, and endorsement by the Federal Government should not be assumed.

Synthesis of Related Literature

A growing body of literature is relevant to establish the context for the described dual degree initiative. It begins with the growing mass of professional and other master's programs as documented by the National Academy's *Science Professionals: Master's Education for a Competitive World*[2]. From this it is clear that industry is clamoring for advanced graduates with a constructive mix of leadership, research, and technological capability. Additionally, increased calls for internationalization are noted by Marginson & van der Wende in *Globalisation and Higher Education*[3],Bhandari's *KeyResearch in U.S. Study Abroad: Findings from the Institute of International Education's Study Abroad Capacity Series*[4], and with respect to China by Zhang's *Response of Chinese Higher Education and SJTU to Globalization*[5].

Much of the good practice generally pertaining to international exchange and dual degrees can be found in the recent publication by the Institute of International Education (IIE)entitled *Joint and Double Degree Programs: An Emerging Model for Transatlantic Exchange* [6]. Additionally the proceedings of the most recent Atlantis project directors'conference[7] and the NAFSA: Association of International Educators' web site [8] also contains lessons learned from cogent experience. Similarly, the ASEE's conference proceedings [9] have increasingly documented attention by engineers and technologists to international exchange and dual degree programs [10, 11]. Similar attention has occurred in related fields, e.g., business [12]and information technology [13].

Project Concept and Objectives

The Purdue – DIT - UPC project proposes dual master's degrees that focus on the critically needed technology innovation and sustainability skills which will make individuals, enterprises and nations more competitive and responsible. It does this by synergistically combining the strengths of three leading universities as well as capitalizing on the sensitivities generated by significant international and language experience. The result will better prepare students for work in an international context and for effective citizenship in our increasingly interconnected, globalized world.

The project's program of study, comprised of a slate of currently existing courses, and new collaborative courses offered by the three partner universities and focusing on the critically needed technology innovation and sustainability skills will lead to two existing MS degrees. Students will be able to enter, pursuant to a collaborative application and admissions process, via any of the three partner universities and after completing the program successfully, they will graduate with a Masters of Science (Technology) from Purdue University and an existing Masters degree from the European partner via which they entered the program. One joint research &development-based capstone Directed Project/Thesis is required of all students. Beyond the course requirements designated by each institution, students' study will be tailored to their specific goals by a faculty committee consisting of two Purdue and two European faculty. In addition to the two degrees awarded upon completion, each student will receive a transcript and diploma supplement from each partner university. The European Masters degree may be awarded by either of the two European partner institutions. The duration for the program is planned for four semesters, which is shorter than were the student to pursue two separate

programs on their own. This fact in addition to the waiving of external student tuition fees for the exchanging students and the 12K $ or € Stipend will result in substantially lower costs. Because the degrees that will be awarded currently exist at the partner institutions, it is guaranteed that they will be recognized by the appropriate authorities in Ireland, Spain and the USA.

The consortium's ability to fast track the start of this project is based on the current existence of almost all of the components necessary to offer the dual masters degrees. Each institution has a slate of existing required and elective graduate courses/modules, experienced graduate faculty, and established graduate procedures in place. Memoranda of Understanding are already in place as are effective inter-partner communication mechanisms that include video-conferencing.

Project Objectives & Outcomes

The project's chief objective and outcome is the cadre of exchanged master's degreed graduates with significant experience at each of the three partner institutions. These students will benefit from an innovative program that develops leading edge understandings and skills with technology, innovation and sustainability and that promotes transatlantic mobility. By design the outcome will include global perspectives, multiple culture awarenesses and sensitivities, as well a professional level Spanish and English language capabilities. Important additional outcomes include:

- Faculty scholarship pertaining how to do effective exchanges and promote international collaboration
- Increased transatlantic faculty and administrator mobility
- Collaborative research and teaching based on increased mutual understanding and faculty contact due to mobility
- Better administrator, faculty and student understandings of cultures and global perspectives
- Enhanced procedures in place for collaboration and exchange due to increased transparency, reciprocal recognition of credits

MS Degree Outcomes

Upon completion of the Masters of Science in Technology Degree focused on Technology, Innovation and Sustainability, Students will demonstrate:

1. Enhanced capability with research & development. They will:
   - become familiar with research and experimental design sufficient to apply it to real world problems
   - be able to apply design and development procedures to real world problems
   - demonstrate the necessary professional, research and development skills common to industrial technology disciplines, as evidenced by successful completion of either a thesis or a directed project, that are required for successful life long learning and professional contribution.
2. Global perspectives on technology, technology management & sustainability. They will:
   - be able to employ project management, technology assessment, sustainability analyses applicable both to their native culture as well as in other cultural settings
   - be able to establish the appropriateness of technology for specific cultural settings

- use knowledge of how industrial technology impacts society and organizations, from both a technical as well as a leadership and management perspective and they will demonstrate critical thinking in these arenas.

3. Innovation and related process skills. They will:
   - be able to employ key creative and innovation generation procedures
   - be able to sophistically retrieve information from databases and global sources
   - advanced product realization and commercialization skills
4. Awareness of and capability with entrepreneurship procedures. They will:
   - become capable with entrepreneurial procedures and skills
   - be able to secure business related information from sources around the world
5. Enhanced cross cultural communication & professional effectiveness. They will:
   - become proficient in professional communication (reading, writing and speaking/presenting) in at least two languages
   - demonstrate effectiveness in operating in a culture/country other than their native one.
   - demonstrate ethical leadership and a commitment to their personal professional development and life-long learning
6. A graduate level of technological expertise in one or more of the technology fields.

Critical Implementation PhaseIssues

Among the lessons the partners have learned by experience with exchange programs is the criticality of selecting the right partners and then interacting extensively enough, at each other's site, to build significant understanding, rapport and trust. Central to this understanding is in-depth cognizance of each other's vocabulary, academic calendar, course content and scheduling, credit and grade equivalencies, and instructional culture. Subsequently all of these plus the essential survival aspects such as living/housing conditions, and travel must be carefully integrated into systematic orientation activities in order to both prepare students adequately and also control their expectations.

During the start-up phase of this project two essential items have already been developed. First a multi-institution Memorandum of Understanding [available at http://www.tech.purdue.edu/Atlantis/] was crafted that met each partner's needs and that spelled out the guiding principles (not administrative detail) of our partnership. Subsequently, the partners constructively drafted a program of studies that met the various administrative requirements of schedule, calendarand feasibility while at the same time operationalizing the aspirations set out by the target student outcomes for the degree program. The current draft of this program of studies is presented in Table 1 later in this paper.

Added Value

There is significant added value in the dual degree opportunity that results from the synergistic combination of strengths of three leading technologically focused universities. Purdue brings to the program its strengths in computer visualization, industrial technology and senior faculty; DIT contributes well-acknowledged manufacturing and design strengths and UPC shares Europe's leading sustainability initiative. Additionally this exciting partnership creates distinctively European added value by focusing on thoughtful technology and by capitalizing on:

- Complementary strengths across the three partner institutions
- Injection of additional national and cultural perspectives
- Different instructional and learning culture approaches
- Participation of a more diverse student cohort
- The readily availability at each university of sophisticated distance learning and collaboration technology

Integrated Program of Study Program

The central thematic concept for the proposed dual degree program is one focused on Technology, Innovation and Sustainability. Many nations of the world are speaking to the centrality of innovation to their economic future. But how will they enhance the innovation ability of their citizens? And how will this occur in a more responsible stainable manner than has been the history of so many now in trouble nations? The program of study incorporates the best of what is known about technological innovation, research and development, and sustainability. Furthermore, it does so not by abstracting these concepts into a philosophical or theoretical discourse but rather into the pragmatic application of these concepts to real world industry, business, and technology.

The program of studies leading to the dual masters degrees conceptualized for this project has been carefully discussed and conceptualized by faculty from the partner institutions to systematically develop the target outcomes focusing on sustainable technological innovation. As such it is an integrated program that includes both required and elective courses/modules. All of the courses/modules required for the common study program currently exist at one or more of the partner institutions. The culminating research and development (Directed) project and up to three existing courses will be collaboratively vetted and accepted by each of the partners as their own, regardless of which institution provides it to the students. It is envisioned to augment this array of courses with yet a few more leading edge ones to be collaboratively developed to enrich the elective and tailoring portion of the program.

A committee consisting of two USA and two European graduate faculty will guide the student through his/her program planning to maximize the effectiveness of their choice of electives in consideration of the student's career goal. The required research and development based directed project will also be guided by this committee which also serves as the students final examining committee. The program will culminate in the award of two Masters degrees (one from each side of the Atlantic) and the issuing of transcripts and diploma supplements from each of the three partner institutions.

The key content components, overviewed in Figure 1, of the dual degrees include formal study of:

- Research and development and statistics
- Technology policy and innovation
- Globalization and international perspectives
- An international language
- A technology deepening or broadening experience that could, depending on student interest and background involve: Product realization and commercialization, Supply chain

excellence; Sustainability analyses; Creativity and innovation processes; Quality initiatives and the like.

The master's degree programs culminate in one jointly agreed upon directed project that serves as the capstone demonstration of the integration of all learnings and language capabilities. This project, which has been used effectively for more than 15 years at Purdue University, and similarly at numerous other institutions with programs that focus on applied technology, is a formal documentation of a research project that is generally equivalent to a master's thesis but typically much more applied in nature. The overall objective of this requirement is to engage each graduate student in (typically) an industry/business focused R&D project, which is sufficiently involved as to require more than one semester to conceive, conduct, and report. The focus is to be on a topic with practical implications. We plan to involve a four-faculty committee, two from either side of the Atlantic to guide the proposing, initiation and conduct of this R&D project and to then serve as the formal examiners for the degree.

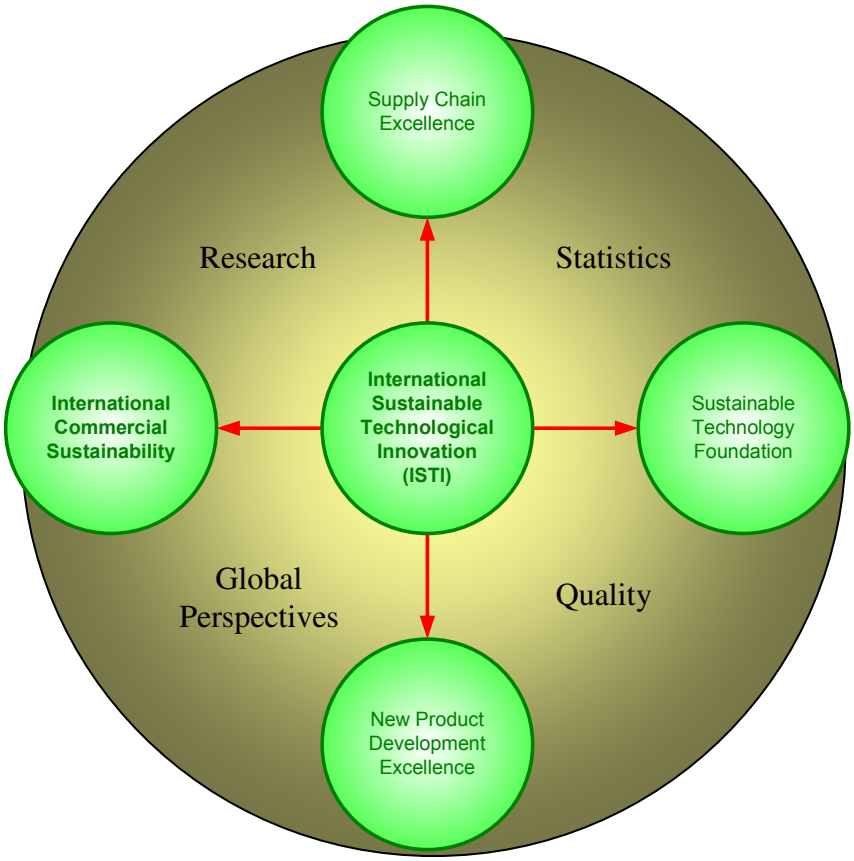

Figure 1. Program Content Overview

An overview of the four semester program's credits is shown in Figure 2. It depicts the minimum credits taken at each university and the shared credit that enables award of the dual degrees.

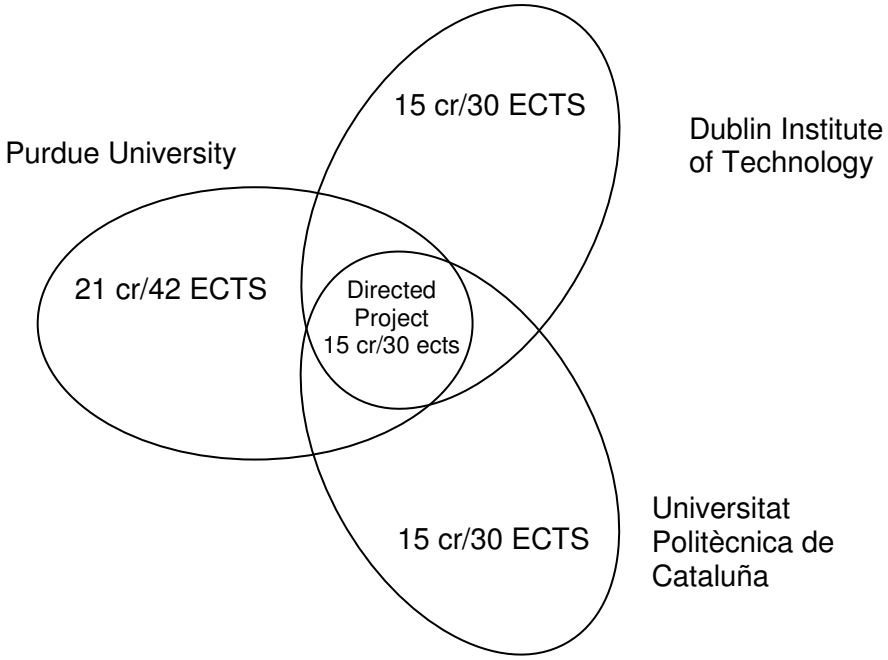

Figure 2. Program Credit Allocation Model

We envision program mobility to be largely determined by language capability. This means that we will structure mobility to maximize preparatory study of the Spanish or English language (whichever is the second language) so that when students actually go for their semester (s) abroad in their second language that they will have already studied that language for at least two semesters. The semester program model as depicted in Table 1 presents a typical study program envisioned for Purdue University student entrants. DIT entrants would study semester 1 at DIT followed by Semesters 2 and 3 at Purdue University and Semester 4 at UPC. UPC entrants would study Semester 1 at UPC followed by Semester 2 at DIT and then Semesters 3 & 4 at Purdue University. Note, if a student's language capability in the second language is high enough at any point, then of course they may vary the semester rotation to suit their planning. It should also be noted that because students will have different competency and experience profiles at entry the example program shown in Table 1 may be tailored to achieve the overall desired objectives. Overall the program is envisioned to operate as shown in Figure 3.

Table 1. Dual Degree Program Content Model

Dual Degree Master's Program Model

Semester 1

Location: Purdue
Start: Aug 24, 2009 End: Dec 19, 2009
Modules/Courses:

Name/Title	ECTS	CrHrs
Stat 501 or IT 507 Measurement & Eval in Industry & Technology	6	3
Tech 646 Analysis & Research in Industry and Technology	6	3
IT 571 Project Planning & Management	6	3
Technology Innovation Elective	6	3
Tech Elective (for Irish students only)	6	3
International Interaction Seminar	NC	NC
Spanish (for US & Irish Students) or English (for Spanish Students)	6	3
Totals	30	15

Semester 2

Location: Purdue
Start: Jan 11, 2010 End: May 8, 2010
Modules/Courses:

Name/Title	ECTS	CrHrs
Tech 508 Quality and Productivity in Industry and Technology	6	3
Tech 598 Research-Directed Project	6	3
OLS 579 Emerging World Class Leadership strategies	6	3
Technology or Innovation Elective	2	1
International Interaction Seminar	NC	NC
Spanish (for US & Irish Students) or English (for Spanish Students)	6	3
Totals	28	13

FYI: Purdue Summer 2010: May 17 – Aug 6, 210 Purdue Fall 2010: Aug 23 – Dec 18, 2010 Purdue Spring 2011: Jan 10 – May 7, 2011

Semester 3

Location: Barcelona**
Start: October 2008
Modules/Courses:

Name/Title	ECTS	CrHrs
Human sustainable development	5	2.5 min
Social and Environmental Aspects of Information Technology	6	2.5 min
Measuring for sustainability	5	2.5 min
Culture, technology and innovation	5	2.5
Tech 598 Research-Directed Project	10	5
International Seminar-Sustainable Technological Innovation	NC	NC
Spanish (for US & Irish Students)	5	2.5 min
English (for Spanish Students)	5	2.5 min
Totals	35	17.5

Semester 4

Location: Dublin
Start: 20th Sept 2010 or Jan 10th 2011
Modules/Courses:

Name/Title	ECTS	CrHrs
Advanced Time Compression Technologies (New)	5	2.5 min
International Supply Chain Design	5	2.5 min
Technology Elective	5	2.5 min
Tech 598 Research-Directed Project	10	5
International Interaction Seminar	NC	NC
Spanish (for US & Irish Students)	5	2.5 min
English (for Spanish Students)	5	2.5 min
Totals	30	15

FYI: DIT Projected Fall 2010: 20th Sept.-Dec. 17th
DIT Projected Spring 2011: Jan10th-May 27th

Note: This model envisions a Single Project managed by a faculty team from both sides of the Atlantic. The project would accrue a minimum of 30 ECTS credits in total. However, credit would be awarded for Progress by local institution where participant was cited i.e. Purdue would award 10 ECTS (assigned to TECH 598). The two European partners would award 10 ECTS locally. Specific proportions can vary, of course, depending on the specifics of each project

* Note all courses/modules currently exist unless otherwise indicated

** UPC also has an extensive list of available elective courses appropriate to this degree

Overall Totals

Taught Credits	ECTS	CrHrs
Purdue	44	22
DIT	20	10
UPC	20	10
Total	84	42

Project/Research Credits	ECTS	CrHrs
Total	32	16

Credits Awarded By	ECTS	CrHrs
Purdue	56	28
DIT	30	15
UPC	30	15
Total	116	58

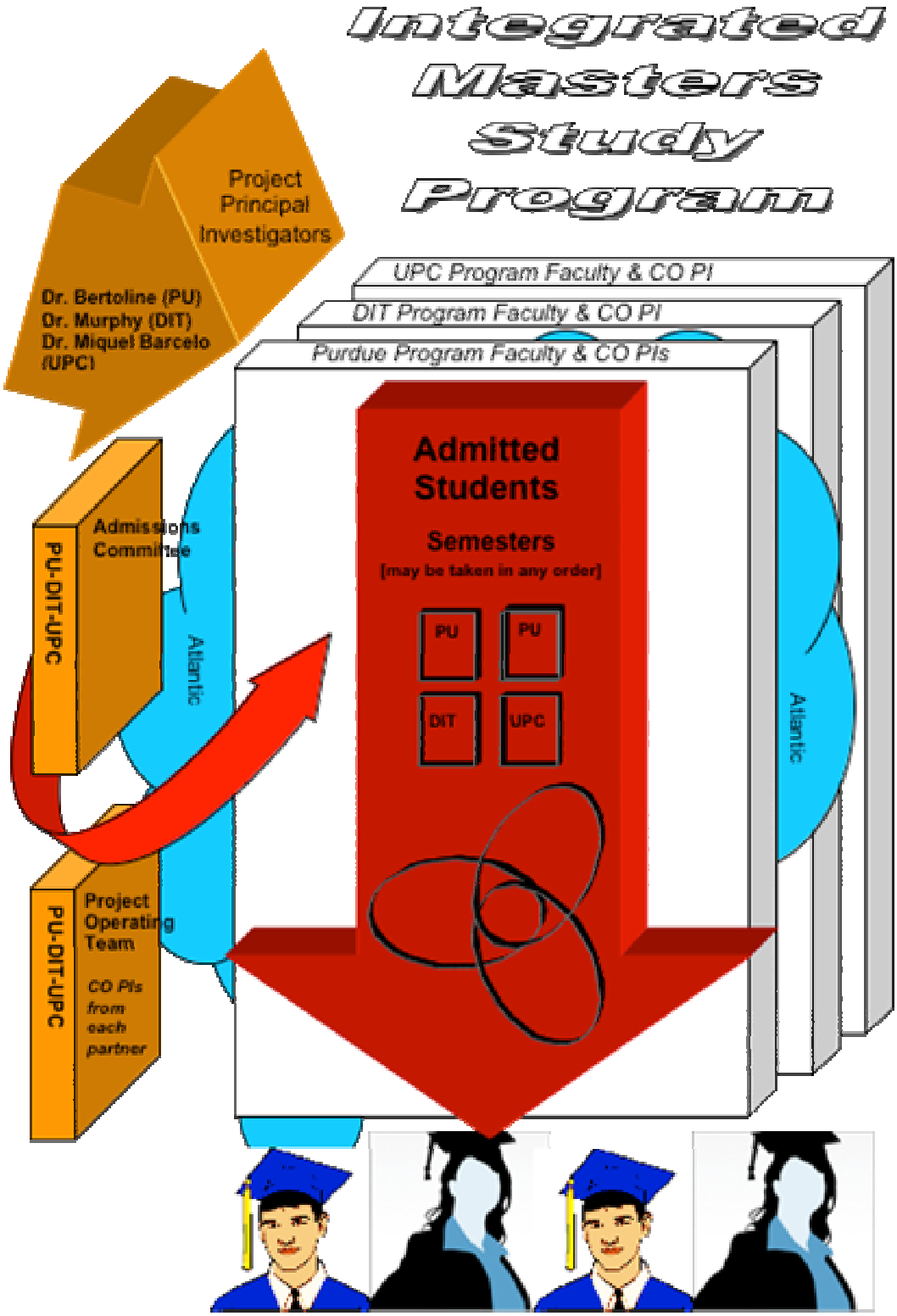

Figure 3. Project Operation Overview

Integrated admission standards

Students will apply to the dual degree program through a common application procedure.A shared set of admission criteria and a joint admission committee consisting of the designated head of graduate studies for each of the degree awarding programs will effect the student selection.

Examinations and progression (transfer) requirements

Each of the partner institutions agrees to recognize the academic merit of each other's formal courses and/or modules. Transfer of credits earned at a partner institution, as documented by the MOU provided in Appendix A, is subject to the maximum established by the accepting institution. For Purdue this amounts to 12 credits (24 ECTS), for DIT this amounts to 45 ECTS, for UPC this amounts to 60 ECTS.

The final examination and defense of the student's research and development based directed project will be conducted by the students graduate committee (consisting of two Purdue University graduate faculty and two European institution (DIT and UPC) graduate faculty. The decision of this committee is the final examination and essential to recommending a student for graduation. This examination can only be administered upon successful completing of all course requirements. Students transferring to a partner institution in this project may regularly do so only after successful completion of all requirements for the term at their current institution.

Degree Award

The awarding of a recognized masters degree is guaranteed by the fact that each institution is will be awarding an existing masters degree that are currently recognized. It is envisioned that successful completion of all program requirements will result in the award of Purdue University's Masters of Science (Technology) degree, and one of either DIT's Masters of Science or UPC's Masters of Science (e.g. Sustainability), depending on through which institution the student entered the program. The master's degrees awarded are applied in nature and each requires both in-depth study in the discipline of technology, including an appropriate specialization, a study of research and development procedures and the communication of their results, development of professional capability in a European language, in this case Spanish.

Systematic Language Instruction & Assessment

This transatlantic master's degree initiative will provide EU and U.S. students with the possibility of using at least two European languages (English and Spanish) as spoken in Ireland and Spain where the consortia institutions (DIT & UPC) are located. The Spanish language spoken in the Spain at the UPC where the student may receive their degree will be studied intensively. At each institution, the student's foreign (second) language skills will be assessed by internationally recognized tests (e.g., IELTS, TOEFL, TOEIC or Cambridge). Both Spanish and English assessment is available regularly at each of the three partner universities and in addition they offer a rich variety of support services to students developing functional competency in a second language.

For U.S. students, the goal is that as a result of obtaining a second degree in Europe, the student must gain sufficient knowledge and skill in Spanish to use that language in a professional capacity. Irish students will achieve similar competency in Spanish. Because the second European language in Ireland is English an emphasis on Gaelic culture and the traditions and trends of Ireland will be substituted. Spanish students will gain sufficient knowledge and skill in English to use that language in a professional capacity. In addition to systematic, course-based language instruction, each student at each site will have access to a variety of language support mechanisms.

One of the project team's key objectives and central to the goals of the proposed transatlantic master's degrees is to enable students to gain international insights, competence and cultural experience as a vital part of our project.

Tuition and Fees

The core of this project is a systematic exchange activity across the three institutions. This exchange will be balanced in terms of European students and American Students. Because of this balance it is possible to eliminate any out of state or out of country tuition fees being charged by Purdue University. This is predicated on reciprocity by the two European institutions which will not charge such fees either. Each participating student, however, will be personally responsible for a small range of fees covering such things as books, health insurance, etc. and these are paid to the host institution during each semester. Additionally students are responsible for their housing and food costs.

Student Services

Purdue University, Dublin Institute of Technology and UPC each have a comprehensive range of support services to facilitate student, both native and international, success. In addition, specific to this program, each institution will have a faculty lead contact mentor who will counsel and support the exchanging students specifically. They will provide course selection guidance, instructions for key orientation activities, visa application support, and faculty committee member selection.

Pre Departure Orientation will include but not be limited to: academic and instructional culture at the overseas institutions; living arrangements; student ethics; travel and local transportation; language learning and support; maps and regional information; receiving institution contacts; faculty information; emergency communications; academic calendar; and the like. Health insurance coverage arrangements are another critically important part of pre-departure preparation.

Incoming Student Orientation will include but not be limited to welcomes, introductions to faculty and staff, local mentors; transport and geography details; identification cards; computer and library access mechanisms; university and departmental orientation; language instruction; International office personnel; social integration activities and schedule; health insurance and medical services; bank account establishment; etc. The project institutions' existing experience with the current Atlantis Mobility (UG) students has resulted in the development of a thorough

orientation program that addresses the most important aspects of adjustment and thereby establishes a solid foundation for student success.

Faculty mobility

An integral part of this transatlantic degree project is the short-termexchange of faculty across the Atlantic. This will involve instruction in the program, research collaboration and joint scholarship related to learning and program improvement. Also envisioned is the exchange of administrators (at Dean and Department Head levels), funded in part from the project. Faculty exchanges are anticipated to involve the following activities:

- Participation in the final defense of a candidate's directed project
- Teaching a course/module at a partner institution
- Delivering a one or two week instructional unit as part of a module/course
- Exploring and/or collaborating on a research and development project
- Familiarization with a partner institution's program, faculty and courses/modules

This mobility is front end loaded to prime the exchange activity and increase faculty and administrator familiarity with the UPC in particular. Administrators will be expected to contribute to their travel costs from non-project funds.

Project Students

Students targeted for participation in this project will be young professionals and/or recent graduates from four-year baccalaureate or diploma engineering or technology or related programs. Those with career aspiration in technology-based international corporations or business will be most likely recruits. Specific efforts will be made to encourage female and otherwise under-represented participants in the engineering and technology professions. Providing of project recruitment materials to the numerous specialty organizations focusing on the recruitment of women and underrepresented populations will be one specific way that we will address this important aspect of the project's success.

Project Activities

Students selected to participate in this Trans-Atlantic Dual Master's Degree program will engage in a systematic program of activities that will have them:

1. Participate in regular classes per the program of studies
2. Participate in a trans-Atlantic seminar conducted by video-conference multiple times each semester
3. Engage in individualized student degree planning in consideration of the specific student's career goals and prior experience and education. This process will incorporate all program requirements and capitalize on the inherent flexibility of each consortium institutions graduate program by enabling election of courses from a wide range of modules
4. Undergo language assessment in either English or Spanish to determine appropriate placement in the institutions sequence of language courses
5. Participate in intensive language training and language support system activity, e.g., the Purdue University on-line writing laboratory (available to all students in the project regardless of which institution they are currently studying)

6. Participate in a series of pre-departure orientation activities to properly prepare trans Atlantic student for effective success overseas
7. Participate in a series of welcome and entry orientation activities upon arrival at the overseas host institution
8. Engage actively in a cultural program of activities planned and/or otherwise available in the environment of each university where students are taking courses. This can include sightseeing, museums, music and theatre, involvement with student clubs (note, each institution has a myriad of these), host family interaction, and the like.
9. Participate in international seminars using distance technologies that bring all participating students and faculty, regardless of location, together in a virtual, video-conference based seminar.
10. Develop and defend a proposal of a relevant technology, innovation, industry, sustainability focused research and development project
11. Conduct, write up in a scholarly manner, and defend a relevant technology, innovation, industry, sustainability focused research and development project
12. Provide formative and summative evaluative assessments of project and degree performance

Evaluation for Transatlantic Degree Projects

Barnes Technologies International, LLC, will plan and conduct an independent third party evaluation [TPE] of its effectiveness and formatively guide improvement. Barnes' early involvement is a characteristic of quality planning.

BTILLC will evaluate how the Project improves teaching and student achievement and addresses the two Government Performance and Results Act of 1993 (GPRA) performance measures established for FIPSE Atlantis.

1. The percentage of students pursuing a joint or dual degree who persist from one academic year to the next (persistence); and
2. The percentage of students who graduate within the project's stated time for completing a joint or dual degree (graduation).

In addition, the TPE will assess the degree to which U.S. students gain language acquisition, i.e., how well U.S. students can comprehend technical information written in another language and make formal presentations in another language. The TPE will provide an ongoing analysis of all program components enabling the Project Director to make timely modifications in any component that is not functioning at an adequate capacity.

The process-outcome evaluation model will be used to assess to what degree the Project provides a value added experience for teaching and student achievement due to a comprehensive, coherent and sustainable plan is implemented. At the heart of every phase of this TPE is assessing to degree to which teaching and student achievement is improved by participating in the Project. Key variables, based on the goals and objectives of the project and listed in the tables for context, input, process and product, will be evaluated to assess to what degree the Project is meeting the goals and objectives. Based on the assessment results, the Project Team will adjust its plan to correct for any gaps or problems and align them to produce a sustainable plan.

Project Dissemination

The project team considers this initiative to embody significant scholarly objectives and assessments that must be communicated with the larger profession of Engineering, Technology and International education professionals on both sides of the Atlantic. Consequently a systematic dissemination plan will be employed to mine the project data, to capitalize on individual faculty mobility, experiences and interests and then subsequently disseminate the findings via scholarly journal articles, conference presentations (such as ASEE in the USA and SEFI in Europe), and additionally a collaboratively linked network of Internet Web Sites will also be mounted. The latter will include provisions for student participant input and direct experience sharing. The web site will be used to share products developed by this initiative, e.g., best practices guides, flow charts, forms, recruiting materials and the like.

Sustainability will be encouraged by infusing this project into the routine practices of the participating universities. With positive evaluation results the university administration will be requested to provide existing funding of a number of assistantships/stipends to enabling continuing of the program beyond the four-year funding period. Similarly, the corporate employers of the projects initial graduates will be invited to contribute to the funding of such stipends and assist with the defraying of local expenses.

Project Administration, Operation & Personnel

The operation of this project is greatly facilitated by the ongoing positive commitment of key senior administrators at each institution (e.g., DIT's Dean of Engineering, Purdue's Dean of the College of Technology; and UPC's Vice Rector). In addition the preexistence of Memoranda of Agreement between DIT and Purdue; DIT and UPC: and UPC and Purdue also have eased the project's work because of the trust that these agreements and their supported activities have already established. Given this supportive environment, and the structure previously depicted in Figure 4, the project's principal investigators will form an overall project administrative committee guiding the project and also will be responsible for day-to-dayproject operations.

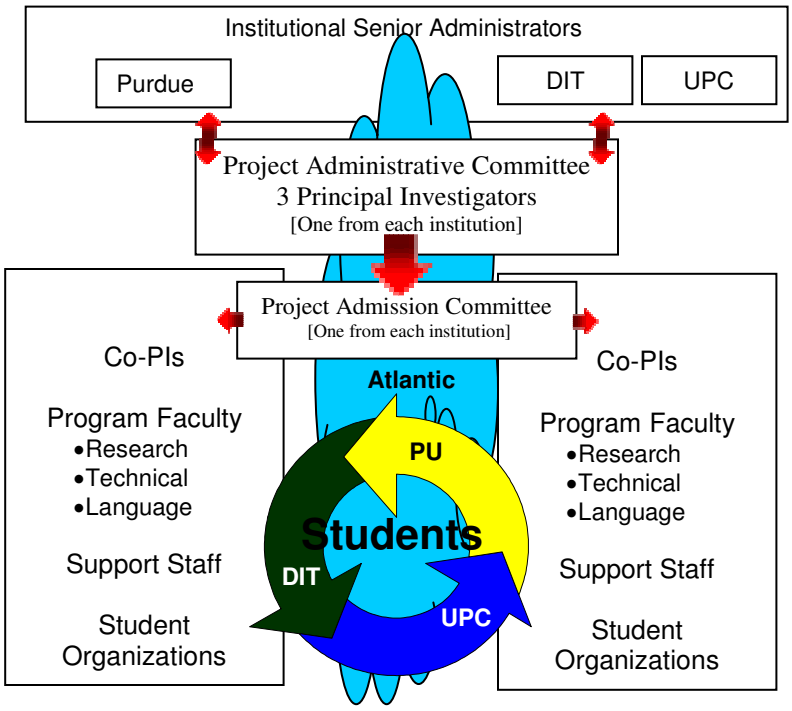

Figure 4. Project Management and Operation

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Appendix A: Multilateral Memorandum of Understanding

Dublin Institute of Technology (DIT), Ireland

and

Universitat Politècnica de Catalunya (UPC), Spain

and

Purdue University (PU), the United States of America

In line with the objectives set by the EU-US Transatlantic Degree Program (Atlantis) to enhance academic cooperation, the above named institutions hereby mutually agree to cooperatively implement a Sustainability, Technology and Innovation (STI) Masters project involving the development and implementation of a dual MSc graduate degree program, establish student and faculty mobility opportunities, and other related actions. This cooperative agreement between and among these participating institutions shall be based on the principles of mutual benefit and shall promote the advancement of education, scholarship, and collaboration.

Article I.
The participating institutions shall act as a consortium to implement the EU-US ATLANTIS supported project referred to herein as the STI Masters project. This project facilitates cross-cultural graduate level student mobility and learning in the integrated sustainability, technology and innovation areas resulting in two MSc awards for successful students, one from each side of the Atlantic. The participating institutions commit to offering the following programs in a manner that facilitates the accomplishment of the project goals:

- DIT, MSc in Sustainability, Technology and Innovation
- UPC, MSc in Sustainability
- PU, MSc in Technology

Article II.
The participating institutions shall purposefully share their respective faculty, student and administrative staff resources as required for the STI Masters project, both through planned and systematic geographic mobility and through the use of distance learning and video conferencing technologies. In doing so, the participating institutions shall draw on their unique characteristics and pedagogy expertise to benefit the STI Masters project implementation.

Article III.
In all communications related to the STI Masters project, unless the context implies otherwise, "home institution" shall mean the institution where the participating student is admitted to the dual MSc graduate degree program, and "host institution" shall mean an institution that has agreed to receive the participating student from their home institution.

Article IV.
The activities involved in the STI Masters project shall be in accordance with all rules and regulations of the participating institutions and shall comply with all applicable federal, state and local laws.

Article V.
The participating institutions agree that all persons shall have equal access to programs, facilities, and admission without regard to personal characteristics other than those related to ability, performance and/or qualifications. The participating institutions shall in no way discriminate against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, gender identity or veteran status.

Article VI.
The participating institutions agree to admit students to the dual MSc graduate degree program that have been recommended for admission by an admissions committee comprised of at least one appropriate representative from each institution. Such recommendation must be pursuant to a mutually agreed upon set of admission requirements that shall meet the minimum existing core requirements of each participating institution in accordance with each institute's admissions policies and procedures.

Article VII.
The plan of study for each admitted student shall be comprised of one academic year in Purdue University and one semester in each European institution.

Article VIII.
Each institution shall honor the existing degree award requirements of the other participating institutions. The participating institutions agree to use the ECTS credit system as the basis for transfer of academic credits earned by students and consider 1 Purdue University credit as the equivalent of 2 ECTS. Participating students must meet the degree award requirements of Purdue University and one of the European institutions in order to graduate from the dual MSc graduate degree program.

On completion of the program European students will be awarded an MSc from their home institution and a Purdue University MSc. On completion of the program Purdue University students will be awarded a Purdue University MSc and an MSc from one of the European institutions. Whether a DIT or UPC MSc award accrues will be decided by the academic program committee in consultation with each individual Purdue University student before engagement in the program.

Article IX.
The participating institutions agree that all assessments passed and credits earned, pursuant to an approved plan of study, shall be fully recognized by all institutions without further review. This recognition shall occur through the transfer of credits earned, subject to each institution's internal rules and regulations.

Article X.
The participating institutions agree that participating students shall be responsible for payment of tuition as normally required by their home institution only.

Article XI.
The following essential commitments are agreed upon by the participating institutions:

1. Participating students shall be registered at both the host and home institutions.
2. A jointly-directed project shall be completed by each participating student to meet the respective degree requirements of each awarding institution.
3. Every effort shall be made to ensure balance in the number of students exchanged.
4. Each participating student shall be responsible for:
    a. Transport to and from both their home and host institutions.
    b. Health insurance and any other health related costs.
    c. Textbooks and other academic related costs.
    d. Any accumulated debts.
    e. Accommodation, food and other personal costs.

Article XII. In all cases in which, as a result of the agreements established herein and their application, the partners believe it is necessary to use the partner's logos, it must ask for the prior authorization of the University, through the Communication and Promotion Service or similar entity, specifying the application in which they wish to use the logo (whether graphic or electronic or any other format) and for what they wish to use it. The authorization, which must always be in writing, shall specify the use(s) being authorized, as well as the period during which the authorization shall remain valid, which must never be later than the period of validity of this agreement. However, when logos or other identifying marks are to be used for activities that will generate profit, the corresponding trademark license contract must be signed.

Article XIII. This memorandum is signed in accordance with, and to meet the goals of, the requirements of the supporting funding agencies, Fund for the Improvement in Post-Secondary Education (FIPSE) of the United States Department of Education and the Education, Audiovisual and Culture Executive Agency (EACEA) of the European Union, for the EU-US ATLANTIS STI Masters project. This memorandum does not supersede or replace any existing Memoranda of Understanding or other agreements between or among the participating institutions. This memorandum shall remain in force until 31st August 2013 or for the duration of the STI Masters project to enable degree completion by all active students.

In WITNESS THEREOF, the parties representing the institutions have offered their signatures

Universitat Politècnica de Catalunya

UNIVERSITAT POLITÈCNICA DE CATALUNYA

Professor Antoni Giró
Rector

Date: 16 FEB. 2010

Purdue University

1/11/10

Dr. William R. Woodson
Provost

Date:

1/4/2010

James Almond
Senior VP Business Services

Date:

Dublin Institute of Technology

26/1/10

Professor Brian Norton
President

Date: